Chapter 6

Summary

The Aviation System Capacity Plan is intended to be a comprehensive "ground-up" view of aviation system requirements and development, starting at the airport level and extending to terminal airspace, en route airspace, and airspace and traffic flow management. The first step in this problem-solving exercise is problem definition. This plan defines the aviation capacity problem in terms of flight delays, rather than dealing with the more abstract "capacity" definition. While it is relatively simple to compute an airport's hourly throughput capacity (the number of flight operations which can be handled in IFR or VFR for a given runway operating configuration), that throughput can change each hour as weather, aircraft mix, and runway configurations change. Annualizing airport capacity is thus a difficult task.

In 1990, 23 of the top 100 airports each exceeded 20,000 hours of airline flight delays. If no improvements in capacity are made, the number of airports which could exceed 20,000 hours of annual aircraft delay in the year 2000 is projected to grow from 23 to 40.

While it is common for demand to exceed hourly capacity at some airports, there are ways of accommodating that demand. For example, air traffic management can regulate departures and slow down en route traffic, so flights are shifted into times of less congestion. This is only a temporary solution because as traffic increases at a given airport, there will be fewer off-peak hours into which flights might be shifted.

There are several techniques that are under investigation to manage the demand at delay-problem airports. One is to encourage small aircraft to use "reliever" airports. There could be significant flight-delay reduction if a percentage of small aircraft operations could be shifted to reliever airports; however, some of the forecasted delay-problem airports have a low percentage of small aircraft operations. Those airports are largely "relieved," and further diversion of operations to reliever airports would be of marginal significance in flight delay reduction.

Having first identified forecasted delay-problem airports, this plan next attempts to document planned or technologically feasible capacity development at those airports. The FAA is co-sponsoring airport capacity design teams (formerly task forces) at major airports to assess how airport development and new technology could "optimize" capacity on a site-specific basis. Airport capacity design team studies were completed at Atlanta, Charlotte, Chicago,

cago, Detroit, Kansas City, Los Angeles, Memphis, Miami, Nashville, Oakland, Philadelphia, Phoenix, Pittsburgh, Raleigh-Durham, St. Louis, Salt Lake City, San Francisco, San Jose, San Juan, Seattle-Tacoma, and Washington Dulles.

Moving from the "ground up," this plan identifies new terminal airspace procedures which will increase capacity for existing or new runway configurations. Of the top 100 airports, 30 could benefit from improved independent parallel IFR approaches, 18 could benefit from dependent parallel IFR approaches, 53 could benefit from dependent converging IFR approaches using the Converging Runway Display Aid (CRDA), 32 could benefit from independent converging IFR approaches (TERPS+3), and 14 could benefit from triple IFR approaches. Demonstration programs are underway for these new approach procedures.

Some of the new approach procedures and airport capacity projects require new technology and new systems and equipment. More than three dozen programs are currently under way in FAA's R,E&D and F&E programs to provide that new technology. This plan outlines the progress of those programs.

Many of the technology programs are designed to reduce the capacity differential between IFR and VFR operations. Delays attributable to weather (resulting in large part from the difference in VFR and IFR separation standards) accounted for 70% of all flights delayed 15 minutes or more in 1988. With the use of new technology, that proportion has decreased to 53 percent in 1990. Significant gains in capacity may be achieved with the use of new electronic guidance and control equipment if two or three flight arrival streams can be maintained in IFR, rather than being reduced to one or two arrival streams. These programs are the Precision Runway Monitor (PRM), Converging Runway Display Aid (CRDA), Triple and Quadruple Instrument Approaches, and Microwave Landing System (MLS).

Some of the technology programs are designed to provide more information to air traffic controllers, such as the Center-TRACON Automation System (CTAS), or to pilots, such as the Traffic Alert Collision and Avoidance System (TCAS), with improved visual displays and non-voice communications. Those programs may not show as large an increase in capacity as those programs providing multiple flight arrival and departure streams, but they are significant nonetheless.

Some of the technology programs are designed to improve the efficiency of aircraft movement on the airport surface. The Airport Surface Traffic Automation (ASTA) program, for example, will expedite surface movement while reducing the number of runway incursions.

Some of the technology programs are computer simulation tools to help in airfield and airspace analysis. SIMMOD (Simulation Model), NASPAC (National Airspace Performance Analysis Capability), SDAT (Sector Design Analysis Tool), and TAVT (Terminal Airspace Visualization Tool) will help in the evaluation of various alternatives.

Lastly, some technology programs are designed to "optimize" the aviation system through better planning and improved prediction capability. These include the National Simulation Laboratory (NSL), the National Control Facility (NCF), and Dynamic Special-Use Airspace Management.

The "ground up" view encompasses en route airspace. The plan outlines programs designed to increase en route airspace capacity, including Automated En Route Air Traffic Control (AERA), Advanced Traffic Management System (ATMS), Automatic Dependent Surveillance (ADS), Oceanic Display and Planning System (ODAPS), and Dynamic Ocean Tracking System (DOTS).

Airspace capacity design team projects have been established to analyze and optimize terminal airspace procedures. Projects have been accomplished in Los Angeles, Dallas-Ft. Worth, Chicago, Kansas City, Houston/Austin, and Oakland. Washington, Cleveland, New York, and Jacksonville projects are still in progress. Results or progress reports are included in this plan.

From a "ground up" view, after optimizing existing airport capacity, terminal airspace procedures, and en route airspace capacity using new technology, the next level is adding "reliever" airports and "supplemental" airports for additional aviation system capacity. "Supplemental" airports are existing commercial service airports that could act as reliever airports for delay-problem airports.

Though "supplemental" airports will be helpful, the largest capacity gains come from new airports and new or extended runways at existing airports. One such project is the construction of a new international airport at Denver. Construction began in late 1989. The initial phase will consist of four 12,000-ft runways and a commuter runway and is scheduled to open in the fall of 1993. New parallel runways were put into service at Cincinnati, Indianapolis, and Little Rock prior to mid-1991. A runway extension at Baltimore became operational in 1990 and a runway at Cleveland was reconstructed. Of the top 100 airports, 62 have proposed new runways or extensions to existing runways. Of the 23 delay-problem airports in 1990, 18 are in the process of constructing or planning the construction of new runways or extensions to existing runways. Of the 40 delay-problem airports forecast for the year 2000, 29 propose to build new runways or runway extensions. The total anticipated cost of completing these new runways and runway extensions exceeds $6.5 billion.

The FAA is also pursuing an initiative for the implementation of joint-use military airfields and/or adaptation of former military facilities to civilian use for capacity enhancement to the overall aviation system. The joint-use facilities at Dillingham Army Airfield, Hawaii, and Rickenbacker Air National Guard Base, Columbus, Ohio, have provided congestion relief to the airports at Honolulu and Port Columbus, respectively. Currently, Stewart Air Force Base near Newburgh, New York, and Ellington Air Force Base at Houston, Texas, have been designated for conversion to civilian-use facilities.

System capacity must continue to grow in order to maintain the same level of air service quality. The majority of cities with air service prior to de-regulation in 1978 received more frequent service in 1990. Many smaller cities have benefited from the emphasis on hub-and-spoke airline service in the last decade, receiving more service to connecting hub airports from more than one airline. In the dozen years since airline deregulation, real air fares have declined. System capacity must continue to grow to allow for airline competition if that trend is to continue.

In conclusion, both the quality and cost of air service are strongly tied to aviation system capacity, and will continue to show favorable trends only if aviation system capacity grows.